

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT: LIPP, Eberhard

SERIAL NO.: 09/858,137

ART UNIT: 1723

FILED: May 15, 2001

EXAMINER: Cooley, C.E.

TITLE: MIXING AND REDUCING MACHINE WITH AN UPWARD CONVEYING MIXING
BLADE

REMARKS ON AMENDMENT "B"

Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

Sir:

In response to the Final Action of July 11, 2003, having a response being due with a two month extension on December 11, 2003 and in conjunction with a Request for Continued Examination, please consider the following remarks in conjunction with the amendments to the above-identified application as follows:

REMARKS

Upon entry of the present amendments, original Claims 1-16 were previously canceled, and Claims 17-26 are currently canceled with new Claims 27-39 substituted therefor. Reconsideration of the rejections, in light of the foregoing amendment and present remarks, is respectfully requested. The present amendments have been entered for the purpose of placing the claim language into a more proper U.S. format and also for the purpose of more clearly distinguishing the present invention from the prior art patents.

New independent Claim 27 re-presents the subject matter of former independent Claim 17 and original Claim 1. New Claim 28 re-presents the subject matter of original Claim 8. Claims 29-32 re-present corresponding former dependent Claims 18-21 with corrected dependencies. Claims

33-35 include the subject matter of original Claims 9-11, as dependent on original Claim 8. Claim 36 corresponds to the limitations of Claim 26. New Claims 37 and 38 re-present the subject matter of Claim 22 and Claim 26, respectively, with corrected dependencies. New independent Claim 39 re-presents the subject matter of Claim 26 in independent form.

In the Final Action of July 11, 2003, it was indicated that Claims 23-25 were withdrawn from further consideration as being drawn to a non-elected species. Claims 26 and 22 were rejected under 35 U.S.C. §112, first paragraph because the specification fails to provide an enabling disclosure for the subject matter of those claims. In particular, Claim 26 was presented as a "means-plus-function" without the proper corresponding structure. Claim 22 was also rejected under 35 U.S.C. §112, second paragraph as being indefinite for failing to point out and distinctly claim the subject matter which Applicant regards as the invention.

The Final Action also indicates that Claims 17-18 were rejected under 35 U.S.C. §102(b) as being anticipated by the Marshall patent. Claims 19-21 were also rejected under 35 U.S.C. §103(a) as being unpatentable over the Marshall patent. Additionally, Claims 17-21 were rejected under 35 U.S.C. §103(a) as being unpatentable over the Boxall patent in view of the Marshall patent. Claim 26 was rejected under 35 U.S.C. §103(a) as being unpatentable over the Boxall patent in view of the Marshall patent and Schwing patent and as being unpatentable over the Marshall patent in view of the Schwing patent.

In response to the Final Action, Applicant has amended the claims so as to properly distinguish the present invention from the prior art. New independent Claim 27 re-presents the subject matter of former independent Claim 17 and original Claim 1. Claim 27 has been amended to more accurately describe the features of the present invention. Specifically, the transition zone

is now claimed as "being passable directly therethrough from said first position to said second position". This distinguishing feature is important because the prior art Marshall patent and the combination of the Marshall patent and the Boxall patent do not disclose this feature. In the Marshall patent, a baffle member 28 fills the transition zone between the two spirals, and in the Boxall patent, a bridging element 19 fills the transition zone between the two spirals. The present invention contains no structures in the transition zone such that mixed product passes directly from first position to second position. The shearing action of the baffle member or bridging element is not needed in the transition from the first spiral to the second spiral in the present invention. Furthermore, absence of a structure is important for the present invention because mixing of solid materials is facilitated. Without the baffle member or bridging element, solids will not be clogged through the mixing machine. Importantly, the Marshall patent is specifically drawn to mixing fluids only, unlike the present invention, which anticipates mixing solids and liquids. The previous language only specified "no spiral-shaped mixing blades". The supply lance 6, in the transition zone 19 shown in Figure 1, is presented for the injection of fluids but does not hinder the passage of mixed product directly from the first position to the second position.

New Claim 28 re-presents the subject matter of original Claim 8. Applicant has corrected the election of Species A. As noted by the Examiner, previous Claims 23-25 were withdrawn because these claims were drawn to the non-elected species having the catchment element. Applicant has now canceled the Figures 4-5 and the references to Figures 4-5 in the specification. As previously requested by the Examiner, original Claim 8 of the elected species has now been amended so as to properly depend from the independent Claim 27. Applicant notes that the blade

elements of Claim 28 are clearly disclosed in the remaining figures and that significant portions of the specification provide a detailed enablement of these blade elements.

In further response to the Final Action, Claims 29-32 re-present corresponding former dependent Claims 18-21 with corrected dependencies. Claims 29-32 are made dependent upon Claim 28, which distinguishes these dependent claims from the Marshall patent and the combination of the Marshall patent and the Boxall patent. The new claims are dependent upon a base claim 28 which includes a plurality of blade elements as the first and second spiral-shaped mixing blades. The new dependency is important because the interrupted spiral mixing blades are not disclosed by the prior art or prior art combination. As discussed in the specification:

In order to increase the effectiveness of mixing with the spirals, it has proven to be especially favorable if at least one of the spirals provided is interrupted in the circumferential direction and is comprised of mixing blades that are connected after each other in the circumferential direction. Through this type of interruption of the mixing spiral, the mixed good is mixed in an especially intensive manner, since it is moved in especially small volumes by the blades, and comes to rest again. Moreover, each mixing blade can be equipped with a different conveying angle both in the axial and in the radial direction, whereby an additionally improved mixing effect can be obtained. (Substitute Specification, page 3, last paragraph)

The capacities for axially conveyed quantities, helix angles, blade widths, and peripheral rotational speed are now modified by manipulation of individual blade elements as opposed to the single spiral blade in the prior art and prior art combination. The simplicity, cost-effectiveness and interchangeability of changing capacities for axially conveyed quantities, helix angles, blade widths, and peripheral rotational speed by blade elements are superior to modifications to the entire spiral blades disclosed by the prior art and the prior art combination. With regard to Claim 32 (formerly Claim 21), the claim language now includes a structure to accomplish different rotational speeds by blade elements.

Similar to new Claim 28, Claims 33-35 represent the subject matter of original Claims 9-11, as dependent on original Claim 8. The claim language has been corrected so as to comply with U.S. formality requirements, including proper antecedent bases and dependency on Claim 28. As noted by the Examiner, the non-elected Species B required withdrawal of Claims 23-25, and the present amendment seeks to correct the election of Species A by re-presenting the proper claims drawn to Figures 1-3.

Claim 36 corresponds to the limitations of Claim 26 with the correct dependency on Claim 28 with the plurality of blade elements feature. The subject matter of Claim 36 incorporates the shearing head feature of the present invention as a dependent claim. The Examiner's rejection of Claim 26 as an independent claim will be addressed later because Applicant respectfully contends that the current dependent form of Claim 26 as new Claim 36 is dependent upon an allowable base claim.

In the Final Action, Claim 22 was rejected under 35 U.S.C. §112, first paragraph and 35 U.S.C. §112, second paragraph. In response, Applicant has substituted new Claim 37, which properly recites the counter head element. As disclosed in the specification:

An additional improvement of the mixing effect is obtained when on one end of the mixing blades a shearing head is arranged essentially aligned with the vertical rotating axle, with which the mixed good that is dropping centrally around the rotating axle is again sheared. Also, a desired radial or axial conveyance of the mixed good can be influenced here. Advantageously, this shearing head acts together with a counter head, which has a different rotational speed and/or direction.
(Substitute Specification, page 5, second paragraph)

As such, the new Claim 37 incorporates the "having a counter head for different rotational speeds" as supported in the specification. Applicant respectfully contends that the specification provides an adequate enablement for the different rotational speeds and directions.

In response to the specific rejections by the Examiner, Applicant respectfully contends that the counter head feature does not invoke the "means-plus-function" enablement requirement because the different rotational speed function is not associated with the "mixing spiral means". The counter head, as described in the specification, accounts for the different speeds. The "mixing spiral means" does not provide either the change in speeds or change in direction. One skilled in the art would be able to practice the counter head of the present invention, using well-known principles in the art, such as reduction gears. In further response, Applicant has also amended the Claim 37 so as to correct for the indefiniteness rejection for lack of a structure. The counter head feature is now properly recited to provide a structure, as previously discussed in the specification.

New Claim 38 re-presents the subject matter of Claim 26 with dependency on Claim 27. This new claim now incorporates the shearing head feature as a dependent claim, drawn to the corrected independent Claim 27. Similar to Claim 36, Applicant respectfully contends that the current dependent form of Claim 26 as new Claim 38 is dependent upon an allowable base claim.

In the Final Action, Claim 26 was rejected under 35 U.S.C. §112, first paragraph as lacking enablement and under 35 U.S.C. §103(a) as being unpatentable over two prior art combinations. In new independent Claim 39, Applicant amends the subject matter of Claim 26 so as to address the enablement rejection and to distinguish the present invention from the prior art combinations. In particular, the claim language has been amended to positively recite "a shearing head affixed to a lower end of said mixing spiral means, said shearing head being aligned with said axle" and to cancel the previous description of each of the first and second spiral-shaped mixing blades having a shearing head.

The present amendments to Claim 39 correct the claim language in response to the Examiner's rejection of lack of enablement. The new claim no longer claims multiple shearing heads

positioned after each spiral-shaped mixing blade. The figures only show one shearing head 27, and the new Claim 39 now properly recites this feature. As such, the independent form of Claim 39 is properly supported by the disclosure in the specification, and the shearing head positioned at the lower end of the mixing spiral means is enabled by the figures shown.

In response to the prior art objections, Applicant respectfully contends that new Claim 39 is distinguishable from the prior art combinations. The Boxall/Marshall/Schwing combination does not make the present invention obvious because the features of the present invention are not analogous to the structures disclosed in the prior art combination. The Boxall patent has a bridging element 19, the Marshall patent has the baffle member 28, and the Schwing patent has impellers 11, 27. In this prior art combination, these elements act as shearing devices to disrupt the flow of mixed product between first and second mixing blades. The Schwing patent only adds the additional element of attaching the shearing device to the axle.

The present invention teaches against such placement of shearing devices in the mixing chamber. The first and second spiral-shaped mixing blades and the transition zone achieve the desired shearing effect without the need for the shearing devices in the prior art combination. The transition zone slows the mixed product from the first position, and then shearing is achieved once the mixed product transitions to the second position with the second spiral-shaped mixing blade:

In the embodiment form now proposed according to the invention with two mixing spirals that are connected one after the other in the axial direction and are separated by a transition zone, it is achieved that zones having different axial conveying quantities are connected one after the other, which promotes the intensive intermixing. This is especially the case when the transition zone is free of mixing spirals and the mixed product is thus slowed down at the beginning of the transition zone and is accelerated again at the end of the transition zone through the subsequently connected second mixing spiral. The shearing forces acting as a result in the mixed product lead to a surprisingly intensive mixing.

It should also be mentioned here that for larger systems, several mixing spirals arranged axially behind each other can also be present, each separated by

transition zones. For the sake of simplicity, this will not be dealt with separately in the following.

Fundamentally, the two mixing spirals connected axially one after the other, both of which fundamentally convey in the same axial direction upwards, also have different axial conveyed quantities, whereby in the axial direction, an additional shearing gradient occurs, which amplifies the intermixing. (Substitute Specification, page 2, last paragraph, as amended, to page 3, second paragraph)

As such, the present independent claim restricts the shearing head to an end of the mixing spiral means, unlike the prior art combination. This feature is an important distinction because the shearing devices, like those disclosed in the prior art combination, are no longer required. It is a significant benefit to eliminate extraneous structures which may clog the mixed product and induce higher expenses for construction. Especially when mixing solids in addition to liquids, there are concerns for clogging on the shearing devices.

When considering the second prior art combination of Marshall/Schwing, the new Claim 39 is similarly distinguishable. Without the Boxall patent, the Marshall/Schwing combination fails to disclose the "upwardly conveying direction of the mixing spiral means" (See Final Action, Paragraph 14). Furthermore, both the Marshall patent and the Schwing patent still disclose shearing devices without the placement feature of the present invention. Claim 39 has a shearing head only at a lower end of the mixing spiral, which is not disclosed in the Marshall patent, and the impellers 11, 27 of the Schwing patent not taught against in the disclosure of the present invention.

The present invention is a mixing and reducing machine in the field of industrial mixers for solids and liquids. The mixing machine includes two sets of blade elements arranged in the spiral shape with a transition zone therebetween. Mixed product within the housing of the machine is thoroughly intermixed through the combination of conveying mixed product upward through the housing and shearing by different mixing blades at the first position and second position. The transition zone allows mixed product to pass directly through from the first position to the second

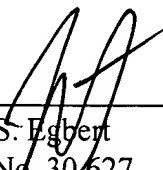
position, without interference or extra shearing by a structural element, and the blade elements of the first and second spiral-shaped mixing blades allow for easy adjustment of blade properties between the first and second positions. For those skilled in the art, the innovations of the present invention over the cited prior art process are significant and patentable.

Based upon the foregoing analysis, Applicant contends that independent Claims 27 and 39 are now in proper condition for allowance. Additionally, those claims which are dependent upon Claims 27 and 39 should similarly be in condition for allowance. Reconsideration of the rejections is requested and allowance of the claims at an early date is earnestly solicited. Since no additional claims have been added above those originally paid for, no additional fee is required for new claims.

Respectfully submitted,

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Date



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